

Name: \_\_\_\_\_

**Welding****Directions:**

Evaluate the student by checking the appropriate number or letter to indicate the degree of competency. The rating for each task should reflect **employability readiness** rather than the grades given in class.

**Rating Scale:**

- 0 No Exposure** – no experience or knowledge in this area
- 1 Not Mastered** – requires instruction and close supervision
- 2 Requires Supervision** – can perform job completely with limited supervision
- 3 Mastered** – can work independently with no supervision

**NOTE:**

\* = Core competencies (essential for the first day on the job).

0	1	2	3	A. Appreciate and apply all personal and workplace safety procedures	AWS (EG2.0-95)
				*1. Identify and correct or report safety hazards	
				*2. Identify and utilize proper storage for flammables	
				*3. Identify and demonstrate correct use of fire extinguishers	
				*4. Identify ventilation hazards and take corrective action	
				*5. Observe and adhere to safety labels	
				*6. Maintain, use and safely work with machines, tooling and equipment	
				*7. Use power equipment, grinder, drill press, and power saw safely/correctly	
				*8. Identify confined space and fall protection hazards	
				Other:	

0	1	2	3	B. Describe and safely interact with all welding systems, including equipment, supplies, tools, power sources, and applied academic skills	
				*1. Obtain and use reference books and charts	
				*2. Apply math to solution of welding problems – whole numbers, fractions, decimals, rounding numbers	
				3. Apply math to solution of welding problems – geometry and trigonometry	
				*4. Identify basic hand tools	
				*5. Select, use, and care for hand tools	
				*6. Identify and store electrodes/filler materials	
				*7. Read and implement welding procedures	
				*8. Identify basic power sources	
				9. Identify structural shapes, sizes, and weights	

				Other:	
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0	1	2	3	<b>C. Interpret designs, drawings, and specifications</b>	
				*1. Read and interpret basic prints	B1
				*2. Interpret welding symbols, abbreviations, and joint designs	B2
				3. Construct an exercise(s) using basic print and sketch	
				4. Make sketches – pictorial and orthographic	B1
				5. Convert English measurements to metric and vice-versa	
				Other:	

0	1	2	3	<b>D. Layout, fit-up and fabricate welding projects</b>	
				1. Make layout of material for plate, structural, and pipe fabrication	
				*2. Prepare material for weld procedure specification (WPS)	
				3. Fabricate parts from a drawing or sketch	B3
				Other:	

0	1	2	3	<b>E. Identify, describe, and demonstrate oxyfuel cutting/brazing</b>	
				*1. Demonstrate safety procedures for oxyfuel cutting/brazing	D1-1,D2-1
				2. Describe theory of oxyfuel cutting/brazing	
				*3. Identify types of fuel gases and their applications	
				*4. Handle, make preliminary safety inspection and store cylinders properly	D1-3
				*5. Identify, select, and set up oxyfuel welding and cutting equipment	D1-3,D2-3
				*6. Light and adjust flame for welding and cutting	D1-4, D2-4
				*7. Pierce holes and cut slots	D1-5,D1-6,D2-5
				*8. Make straight 90-degree and beveled cuts on mild steel plate and pipe	D1-5, D1-7, D2-5,D2-6
				9. Make circle cuts - off hand and with guide	D1-6
				10. Lay out, cut, and fit materials (such as pipe, plate, and structural shapes)	D1-6
				11. Braze weld materials	
				*12. Prepare coupon for testing and pass visual test	
				13. Identify brazing and cutting problems, their causes, and take corrective action	D1-1,D2-2
				14. Identify and select correct brazing rod and flux, if applicable	

				Other:	
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0	1	2	3	<b>F. Demonstrate basic shielded metal arc welding procedures consistent with industry and safety standards</b>	
				*1. Demonstrate safety procedures for shielded metal arc welding	C1-1
				2. Describe theory of shielded metal arc welding	
				*3. Select polarity and current for electrode	C1-3
				*4. Identify and make proper electrode selection for base material and material thickness or follow WPS (weld procedure specification)	C1-3
				*5. Identify joint design and prepare material for WPS	C1-3
				6. Identify shielded metal arc welding problems, their causes, and take corrective action	C1-2,C1-3
				*7. Build pad of beads in horizontal position (qualifies flat position)	C1-4
				8. Build pad of beads in vertical position upward	C1-4
				*9. Visually inspect shielded metal arc weld	
				Other:	

0	1	2	3	<b>G. Create shielded metal arc welds on 3/8" plate consistent with industry and safety standards</b>	
				*1. Make weld in 2F position with E-6010 or E-6011 (qualifies 1F position )	C1-5
				2. Make weld in 2F position with E-7024	C1-5
				*3. Make weld in 2F position with E-7018 (qualifies 1F position)	C1-5
				4. Make weld in 3F position, vertical up, with E-6010 or E-6011	C1-5
				5. Make weld in 3F position, vertical up, with E-7018	C1-5
				6. Make weld in 4F position with E-6010 or E-6011	C1-5
				7. Make weld in 4F position with E-7018	C1-5
				8. Make weld in 2G position with E-6010 or E-6011 (qualifies 1G position)	C1-6,C1-7
				9. Make weld in 2G position with E-7018 (qualifies 1G position)	C1-6,C1-7
				10. Make weld in 3G position, vertical up, with E-6010 or E-6011	C1-6,C1-7
				11. Make weld in 3G position, vertical up, with E-7018	C1-6,C1-7
				12. Make weld in 4G position with E-6010 or E-6011	C1-6
				13. Make weld in 4G position with E-7018	C1-6
				Other:	

0	1	2	3	H. Create shielded metal arc welds on pipe (2" – 6" diameter) consistent with industry and safety standards	
				*1. Make weld in 1G position with E-6010 or E-6011	C1-6
				*2. Make weld in 1G position with E-7018	C1-6
				3. Make weld in 2G position with E-6010 or E-6011	C1-6
				4. Make weld in 2G position with E-7018	C1-6
				5. Make weld in 5G position, vertical up, with E-6010 or E-6011	C1-6
				6. Make weld in 5G position, vertical up, with E-7018	C1-6
				7. Make weld in 5G position, vertical down, with E-6010 or E-6011	C1-6
				8. Make weld in 6G position, vertical up, with E-6010 or E-6011	C1-6
				9. Make weld in 6G position, vertical up, with E-7018	C1-6
				Other:	

0	1	2	3	I. Create shielded metal arc welds on 16 gauge steel consistent with industry and safety standards	
				*1. Make weld in 1F position with E-6010 or E-6011	C1-5
				*2. Make weld in 1F position with E-6013	C1-5
				*3. Make weld in 2F position with E-6010 or E-6011	C1-5
				*4. Make weld in 2F position with E-6013	C1-5
				5. Make weld in 3F position with E-6010 or E-6011	C1-5
				6. Make weld in 3F position with E-6013	C1-5
				7. Make weld in 4F position with E-6010 or E-6011	C1-5
				8. Make weld in 4F position with E-6013	C1-5
				*9. Make butt weld in horizontal position with E-6010 or E-6011 (qualifies flat position)	
				*10. Make butt weld in horizontal position with E-6013 (qualifies flat position)	
				11. Make butt weld in vertical down position with E-6010 or E-6011	
				12. Make butt weld in vertical down position with E-6013	
				13. Make butt weld in overhead position with E-6010 or E-6011	
				14. Make butt weld in overhead position with E-6013	
				Other:	

0	1	2	3	J. Create gas metal arc welds on pipe/plate consistent with industry and safety standards	
				*1. Demonstrate safety procedures for gas metal arc welding	C2-1
				*2. Describe theory of gas metal arc welding	
				*3. Identify, select, and safely handle shielding gases for various metals	C2-3
				*4. Adjust current, voltage, pulse, wire feed rate, and gas flow	C2-4, C2-7
				*5. Identify, select, and set up equipment	C2-2, C2-3
				*6. Identify and select solid wire electrode for carbon steel, aluminum, and stainless steel	C2-3
				*7. Make weld in 2F position with carbon steel and solid wire (qualifies 1F position)	C2-5, C2-7
				8. Make weld in 2F position with aluminum (qualifies 1F position )	
				9. Make weld in 2F position with stainless steel (qualifies 1F position)	C3-6
				10. Make weld in 3F position, vertical up, with material 3/16" or thicker	C2-5
				11. Make weld in 3F position, vertical down, with carbon steel thinner than 3/16" and solid wire	C2-5
				12. Make weld in 4F position with solid wire	C2-5
				13. Make butt weld in 1G position with aluminum	
				14. Make butt weld in 1G position with stainless steel	
				*15. Make weld in 2G position with solid wire (qualifies 1G position)	C2-6, C2-15
				16. Make weld in 3G position, vertical up, with carbon steel 3/16" or thicker	C2-6
				17. Make weld in 3G position, vertical down, with carbon steel less than 3/16" thick	C2-6
				18. Make weld in 5G position, vertical up, with carbon steel (pipe)	
				19. Make weld in 6G position, vertical up, with carbon steel (pipe)	
				*20. Identify gas metal arc welding problems, their causes and take corrective action	C2-2
				*21. Prepare gas metal arc weld for test	
				Other:	

0	1	2	3	K. Create flux cored arc welds consistent with industry and safety standards	
				*1. Demonstrate safety procedures for flux cored arc welding	C3-1
				2. Describe theory of flux cored arc welding	
				*3. Identify, select, and safely handle shielding gases for various metals	C3-3
				*4. Adjust current, voltage, pulse, wire feed rate, and gas flow	C3-3, C3-4
				*5. Identify, select, and set up equipment	C3-2, C3-3

				*6. Identify and select cored wire electrodes for carbon steel and stainless steel	C3-3
				*7. Make weld in 2F position with carbon steel and cored wire (qualifies 1F position)	C3-5
				8. Make weld in 3F position, vertical up, with carbon steel and cored wire	C3-5
				*9. Make weld in 2G position with carbon steel and cored wire (qualifies 1G position)	C3-6
				10. Make weld in 3G position, vertical up, with carbon steel and cored wire	C3-6
				11. Identify welding problems, their causes, and take corrective action	
				12. Prepare flux cored arc weld for test	
				Other:	

0	1	2	3	L. Create gas tungsten arc welds consistent with industry and safety standards	
				*1. Demonstrate safety procedures for gas tungsten arc welding	C4-1
				2. Describe theory of gas tungsten arc welding	
				*3. Identify, select, and set up equipment and explain function	C4-2,C4-3
				*4. Identify, select, and safely handle shielding gases	C4-3
				*5. Identify, select, shape, and install tungsten electrode	C4-3
				*6. Adjust polarity, pulse, current, gas flow setting, and post flow timer and strike arc	C4-3,C4-4
				7. Identify joint design and prepare material for weld procedure specification (WPS)	
				8. Select filler rod for base material	C4-3
				9. Make weld in 2F position, stainless steel (qualifies 1F position)	C4-9
				10. Make weld in 2F position, aluminum (qualifies 1F position)	C4-7
				11. Make weld in 2F position, carbon steel (qualifies 1F position)	C4-5
				12. Make weld in 3F position, stainless steel	C4-9
				13. Make weld in 3F position, aluminum	
				14. Make weld in 3F position, carbon steel	C4-5
				15. Make weld in 2G position, stainless steel (qualifies 1G position)	C4-10
				16. Make weld in 2G position, aluminum (qualifies 1G position )	C4-8
				17. Make weld in 2G position, carbon steel (qualifies 1G position)	C4-6
				18. Make weld in 3G position, vertical up, on stainless steel	
				19. Make weld in 3G position, vertical up, on aluminum	
				20. Make weld in 3G position, vertical up, on carbon steel	C4-6

				21. Make weld in 4G position, with carbon steel	C4-6
				22. Identify gas tungsten arc welding problems, their causes, and take corrective action	C4-2
				23. Prepare gas tungsten arc weld for test	
				Other:	

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>M. Layout and cut materials using plasma arc cutting procedures</b>	
				*1. Demonstrate safety procedures for plasma cutting	E2-1
				*2. Describe theory of plasma cutting	
				*3. Set up and operate plasma cutting equipment	E2-3, E2-4
				*4. Lay out and make straight line cuts	
				*5. Lay out and make bevel cuts	
				6. Lay out and make circular cuts	E2-5
				7. Lay out and make pattern cuts	E2-5
				8. Lay out, cut, and bevel pipe to a 30-37 ½ degree angle	
				*9. Lay out and cut square and round solid stock	
				Other:	

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>N. Demonstrate metallurgy skills in the welding laboratory</b>	
				*1. Demonstrate safety procedures for metallurgy and heat treating	
				2. Identify the classification and physical properties of ferrous and nonferrous metals	
				3. Identify and apply principles of preheating and postheating	
				4. Describe and apply principles of metallurgy in annealing, hardening, and tempering	
				5. Describe methods of testing metals	
				6. Identify types of ferrous metal by spark test	
				7. Describe the relationship between the hardness test of weld, heat-affected zone and base metal, and interpret the results	
				Other:	

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>O. Manipulate material using carbon arc gouging consistent with industry and safety standards</b>	
				*1. Demonstrate safety procedures for carbon arc gouging	E1-1
				2. Describe theory of carbon arc gouging	

				*3. Identify and select electrode size, polarity, current, and air pressure	
				4. Set up and operate carbon arc gouging equipment	E1-2, E1-3, E1-4
				*5. Remove weld material/backgouge	E1-4, E1-5
				Other:	

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>P. Visually inspect welds</b>	
				*1. Prepare sample for visual test per appropriate standard	C1-7, F1-1, F1-2
				*2. Inspect for undercut, overlap, porosity, slag, spatter, and weld size	C1-7, F1-2
				*3. Identify defects and take corrective action based on visual test	C1-7, F1-2
				Other:	

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>Q. Test welds using destructive techniques</b>	
				1. Prepare coupon for bend test per appropriate standard	
				2. Perform destructive test on welds	
				3. Identify defects and take corrective action based on destructive test	
				Other:	

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>R. Test welds using non-destructive techniques</b>	
				1. Prepare sample for non-destructive test per appropriate standard	C1-7
				2. Perform non-destructive test per appropriate standard	C1-7
				3. Inspect for undercut, overlap, porosity, slag, splatter, and surface cracks	C1-7
				4. Identify defects and take corrective action based on non-destructive test	
				Other:	

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>S. Demonstrate leadership skills in the classroom, industry, and society **</b>	
				1. Demonstrate an understanding of VICA, its structure and activities	
				2. Demonstrate an understanding of one's personal values	
				3. Perform tasks related to effective personal management skills	
				4. Demonstrate interpersonal skills	
				5. Demonstrate etiquette and courtesy	
				6. Demonstrate effectiveness in oral and written communication	
				7. Develop and maintain a code of professional ethics	
				8. Maintain a good professional appearance	

				9. Perform basic tasks related to securing and terminating employment	
				10. Perform basic parliamentary procedures in a group meeting	
				Other:	

**\*\*NOTE:** These competencies are addressed in the Missouri SkillsUSA-VICA Curriculum Guide lessons.

0	1	2	3	Explain and demonstrate skills in a specialization area identified by the instructor	Notes:
				1.	
				2.	
				3.	
				4.	
				5.	
				6.	
				7.	
				8.	
				9.	
				10.	